

***NASA Technical Standards Program***

# ***NASA Technical Standards Program Overview***

**Presented to**

**The Defense & Aerospace Standards Users Group**

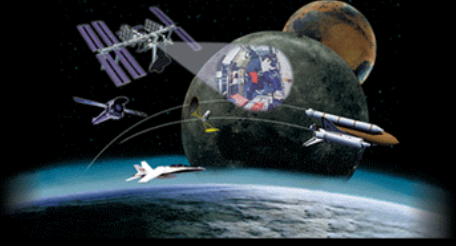
June 17, 2003

NASA Johnson Space Center

Paul S. Gill, Manager

NASA Technical Standards Program Office

<http://standards.nasa.gov>

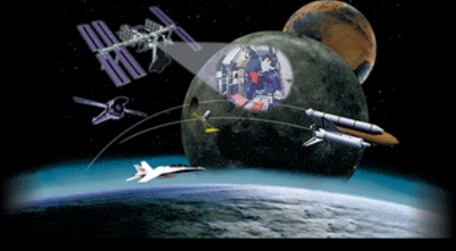


# OUTLINE



## *NASA Technical Standards Program*

- **Background and Context**
- **Goals and Authority**
- **Functional Diagram for the NASA Technical Standards Program**
- **Program Elements**
- **NASA Integrated Technical Standards Initiative**
- **Agencywide Full-Text Technical Standards System**
- **Standards Update Notification System**
- **Lessons Learned/Best Practices/Application Notes – Standards Integration System**
- **Future Plans**

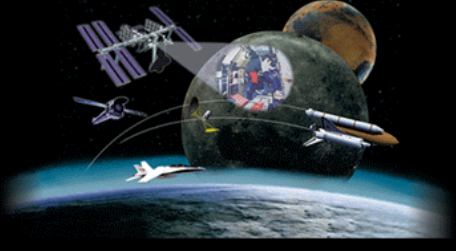


# **BACKGROUND AND CONTEXT**



## **NASA Technical Standards Program**

- **Traditionally, NASA “Technical Standards” Were Built Around Specific Programs and Organizations, e.g.,**
  - Apollo, Shuttle, Space Station, Explorers...
  - NASA Field Centers - MSFC, JSC,...
- **Liberal Use Was Made by NASA of MIL-STD'S. Agencywide Technical Standards Were Generally Limited to Specific Areas:**
  - Safety, Mission Assurance, Electronic Components
  - Construction of Facilities
  - Data Communications Standards
- **Technical Standards Were Mainly Prescriptive and Essentially “Good Forever”**
- **Establishment and Use of an Agencywide NASA Technical Standards Program Has Been Accepted**



# GOALS AND AUTHORITY



## **NASA Technical Standards Program**

### **Goals:**

- Improve and Maintain NASA's Engineering Capability
- Capture and Preserve Engineering Lessons Learned and Best Practices
- Facilitate the Insertion of Technology Into All NASA Programs/Projects

### **Authority:**

- NPD 8070.6, "Technical Standards", October 10, 1997 (Revision in NODIS for Agencywide Review)
- NASA Preferred Technical Standards Program Plan, April 15, 1999
- NPG 7120.5B, "NASA Program and Project Management Processes and Requirements", April 3, 1998
- Public Law 104-113, "National Technology Transfer and Advancement Act of 1995"
- OMB Circular A-119, "Federal Participation in the Development and Use of Voluntary Consensus Standards and Conformity Assessment Activities" (1998)
- NPG 8070.x , Technical Standards Processes (In Development)

***Improving Engineering Tools and Supporting  
"One NASA"***



# NASA Major and Component Installations

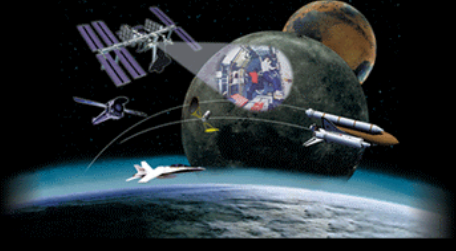


# NASA Organization



\* JPL is a contractor-operated facility.

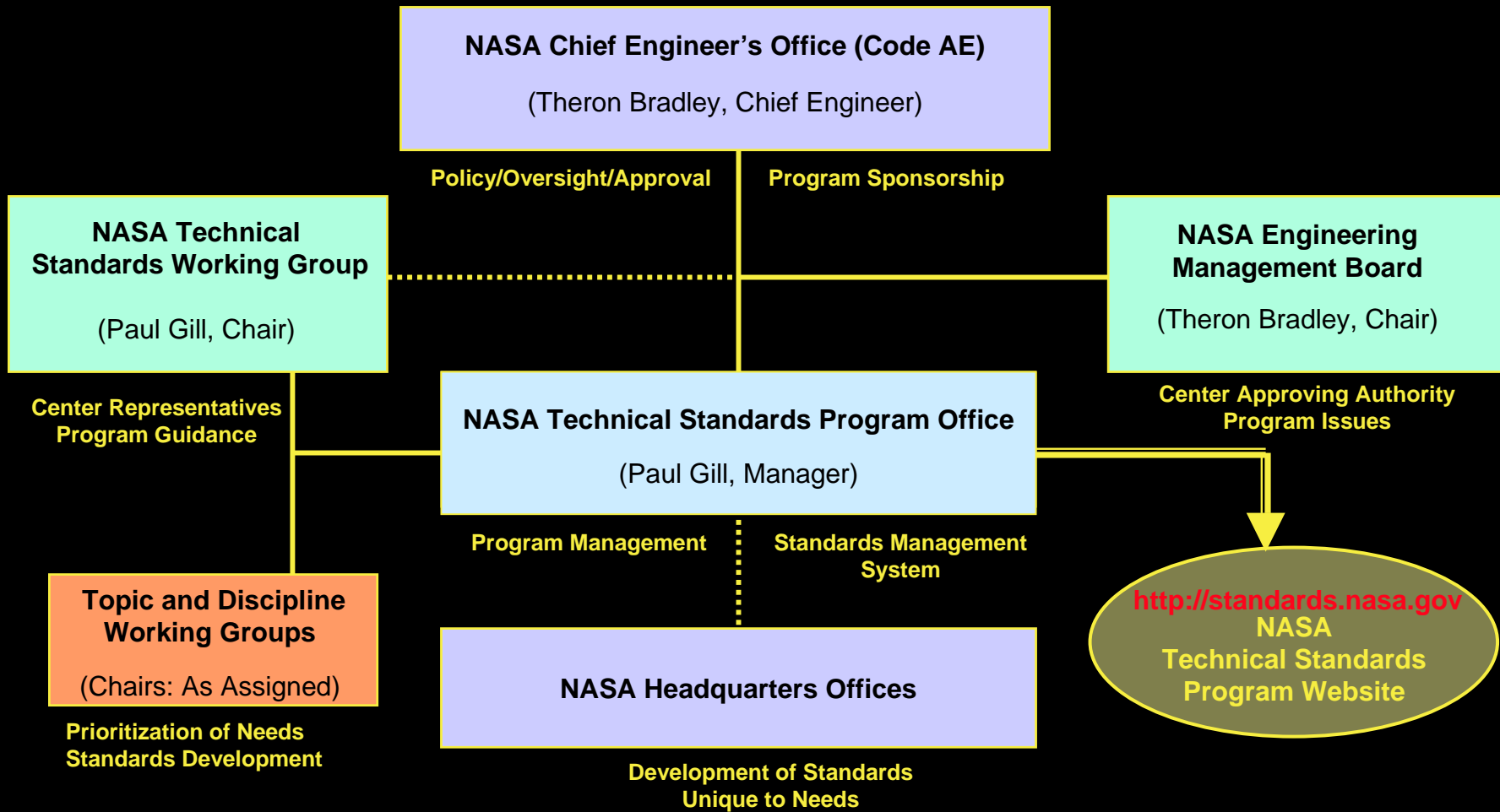


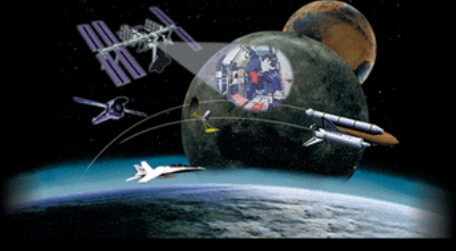


# FUNCTIONAL DIAGRAM THE NASA TECHNICAL STANDARDS PROGRAM



## NASA Technical Standards Program





# **NASA TECHNICAL STANDARDS WORKING GROUP**



**NASA Technical Standards Program**

**(NTSWG)**

**NTSWG CHAIR**

**Paul Gill**

**NTSWG EXECUTIVE SECRETARY**

**Brenda Bailey**

**CENTER REPRESENTATIVES**

**ARC**

**Phil Luna/Laura Doty**

**DFRC**

**Ray Kacmar**

**GRC**

**Frank Greco/Dan Gauntner**

**GSFC**

**George Alcorn/Steven Scott**

**JPL**

**Chuck Shinbrot**

**JSC**

**Nick Lance**

**KSC**

**Larry Schultz/Eric Ernst**

**LaRC**

**Richard Foss**

**MSFC**

**Ed Kiessling/Wendell Colberg**

**SSC**

**Bill St. Cyr/Clifton Arnold**

**WSTF**

**Harold Beeson/David L. Baker**

**HEADQUARTERS REPRESENTATIVES**

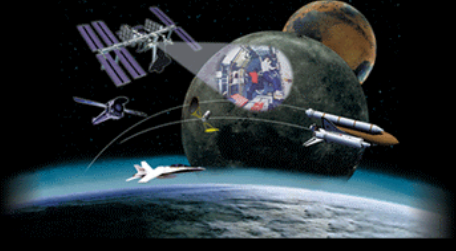
**Richard (Dick) Weinstein, Code AE**

**Robert (Bob) Benedict, Code AO**

**John (Jack) Kelley, Code MT**

**Wil Harkins and Wayne Frazier, Code QS**

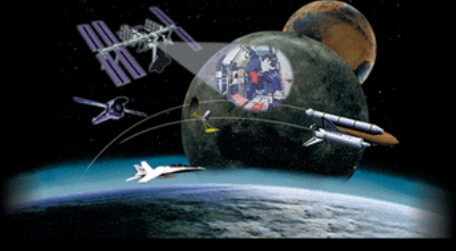




# ***Program Elements***

## ***NASA Technical Standards Program***

- **NASA-Unique Standards Development**
- **Conversion of Center-Developed Standards to NASA Preferred Technical Standards (NASA or Non-Government)**
- **Voluntary Consensus Standards (Non-Government) Adoption and Development**
- **Standardization Awareness**
- **NASA Integrated Technical Standards Initiative**
  - Agencywide Full-text Technical Standards System
  - Standards Update Notification System (SUNS)
  - Lessons Learned/Best Practices/Application Notes – Standards Integration System



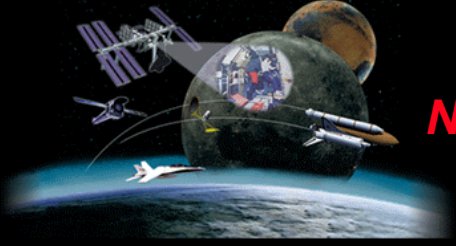
# **SUMMARY**

## **NASA PREFERRED TECHNICAL STANDARDS STATUS TO DATE**



### **NASA Technical Standards Program**

- **NASA Preferred Technical Standards**
  - **59 NASA-Developed Technical Standards**
    - 20 Engineering Standards
    - 20 Information Technology Standards
    - 19 Safety and Mission Assurance Standards
  - **2369 Adopted Standards**
    - 1795 Non-Government Voluntary Consensus Standards
    - 543 DOD/MIL-STD's
    - 21 Federal & CID Standards
- **NASA Preferred Technical Standards in Development or Pending Adoption**
  - 17 NASA Technical Standards in Development
  - 17 Non-NASA Technical Standards In Development
  - 24 Proposals Received for Development of NASA Preferred Technical Standards (FY03 POP CALL)
  - 32 Performance Standards in Review by NTSWG
  - 625 Additional Standards Are Identified as Potential for Adoption but Not Yet Transmitted for NTSWG Review

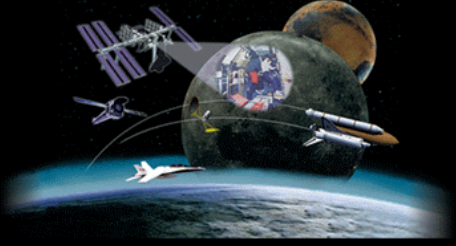


# **NASA INTEGRATED TECHNICAL STANDARDS INITIATIVE**



## **NASA Technical Standards Program**

- **Agencywide Full-text Technical Standards System**
  - In 2000, Awarded Five-Year, Fixed Price Competitive Contract for System Inputs on 108 Domestic and International Standards Developing Organizations (SDOs) Standards Products, Including NASA and DOD, Plus Related Standards Information
  - A Consolidated Acquisition Provides NASA-Wide Internet Access to Technical Standards Products and Associated Information, and Resulted in NASA Savings of Over \$2M/yr (66% Over Independent Contracts) and Better Coverage
- **Standards Update Notification System**
  - Notifies Projects/Programs of Updates to Registered Standards
- **Lessons Learned/Best Practices/Application Notes - Standards Integration System**
  - Technical Standards Are Natural Focal Points for Gathering and Integrating Lessons Learned
  - The System Makes Lessons Learned and Best Practices Readily Accessible by “Hot Linking” Them to Relevant Standards



# ACCESSES AND DOWNLOADS TO FULL-TEXT TECHNICAL STANDARDS by NASA.gov Domain

Jul 2001 - May 2003

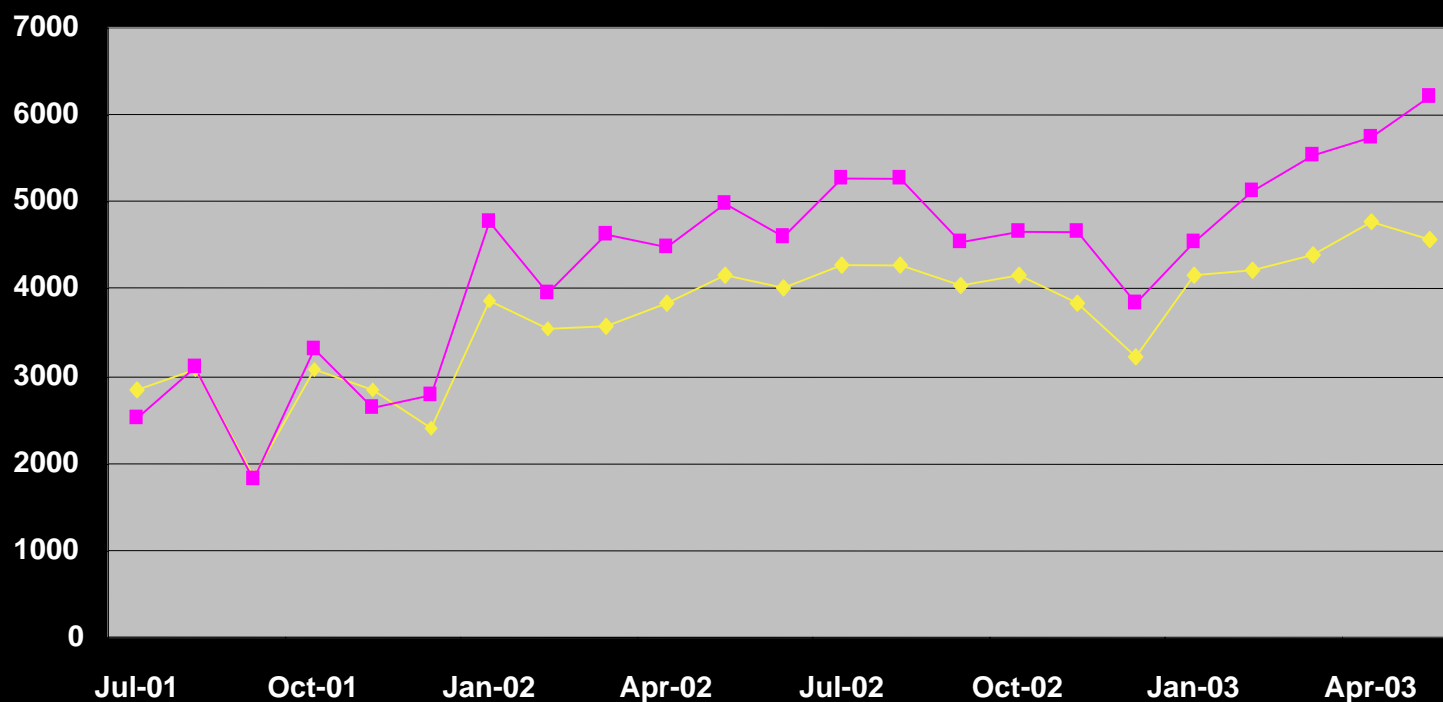


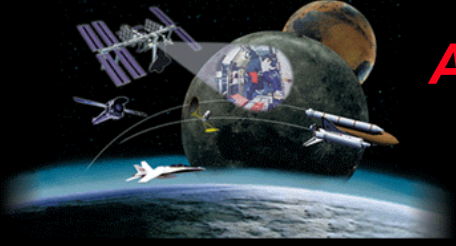
## NASA Technical Standards Program

**Total Accesses: 85,501**

**Total Downloads: 99,347**

◆ **Accesses**  
■ **Documents Downloaded**





# AGENCYWIDE FULL-TEXT TECHNICAL STANDARDS SYSTEM USAGE

Ratio of Accesses and Downloads to Number () of Civil Servants and Supporting Contractors per Facility

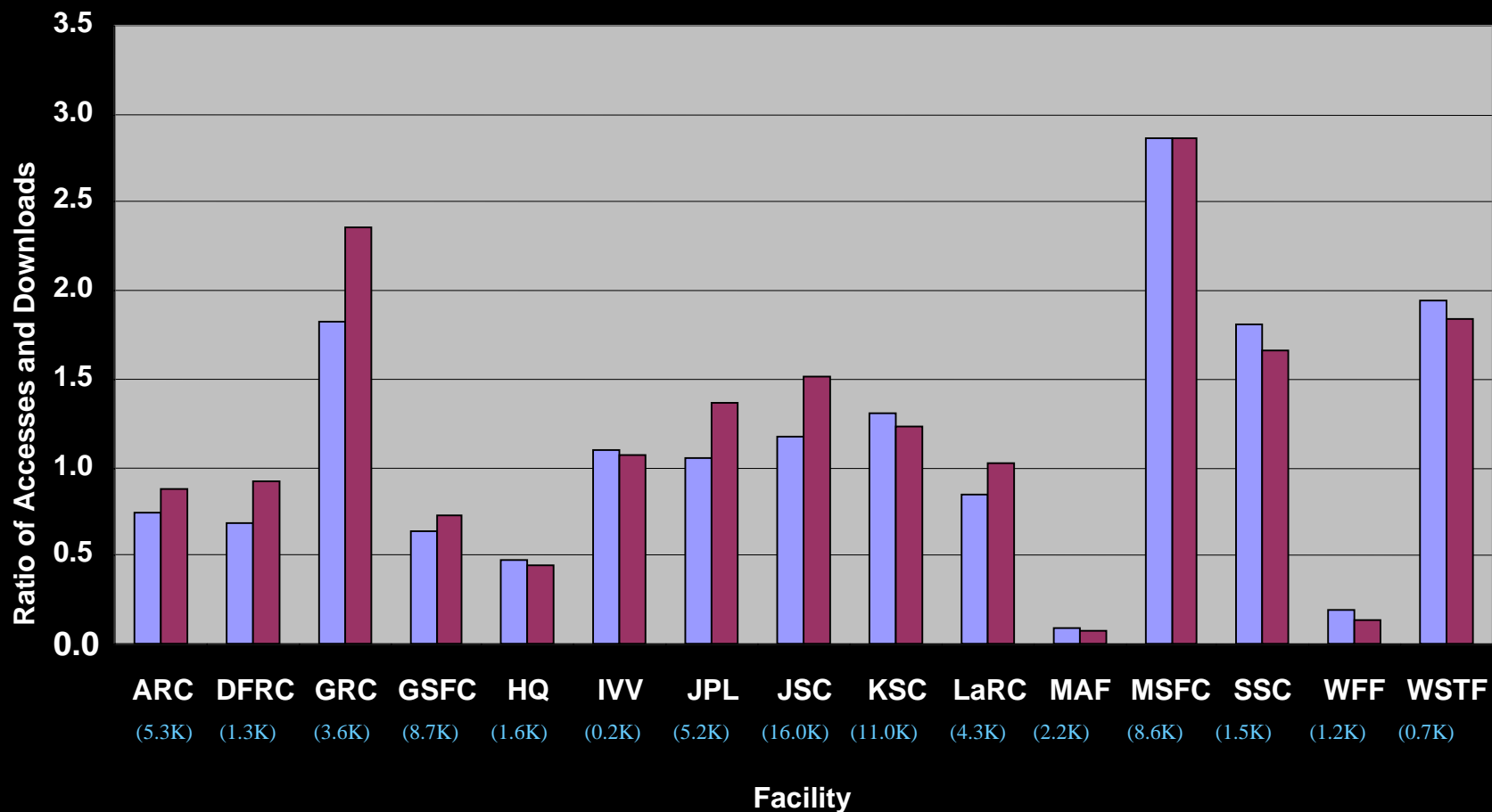
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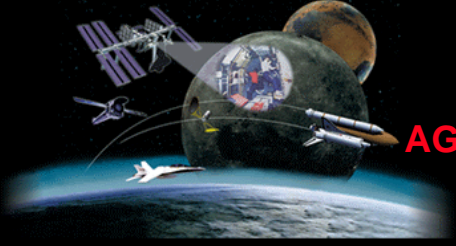


## NASA Technical Standards Program

■ System Accesses

■ Downloads of Standards





# **“TOP 20” SDO ACCESSES**

**AGENCYWIDE FULL-TEXT TECHNICAL STANDARDS SYSTEM**

**NASA.gov Domain**

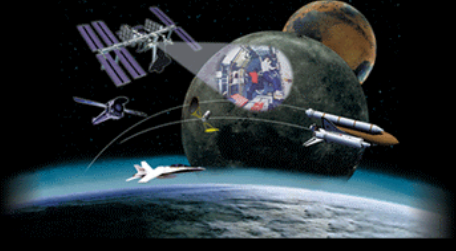
*Jul 2001 – May 2003*



## **NASA Technical Standards Program**

	Organization	Number of Documents Downloaded
1	MIL	35296
2	AIA	13239
3	NASA Developed	11276
4	SAE	9318
5	NASA Center Developed	8763
6	ASTM	5766
7	Other Gov Stds	5459
8	ASME	4887
9	ISO	3359
10	IEEE	2687
11	IPC	1651
12	ASME(BPVC)	1016
13	IEC	700
14	AIAA	567
15	NFPA(Fire)	502
16	CGA	380
17	AWS	373
18	Guide/Spec/Pub	372
19	EIA/TIA	356
20	CSA	334



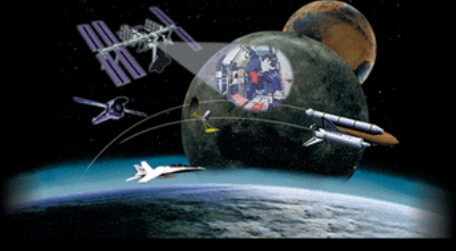


## **STANDARDS UPDATE NOTIFICATION SYSTEM (SUNS) “ALERT”**



### **NASA Technical Standards Program**

- **Changes to Technical Standards Can Have Major Impacts on the Safety, Performance, Reliability, and Cost of the Agency’s Programs/Projects; Using Out-of-Date Standards—Unless Consciously Done to Meet a Specific Requirement—**
  - Ignoring Revisions to Standards Ignores New Processes and Technology; It Misses the *Benefits* of Recent Experiences
  - Exposes Programs/Projects to the *Risk* of Repeating Those *Failures* That Led to Update of the Standard
  - SUNS Allows Users to Register Interests, Receive Automatic Notification of Standards Being Revised, Re-issued
- **To Date:**
  - 5082 Document Update Requests Received
  - 1420 Document Update Notifications Sent

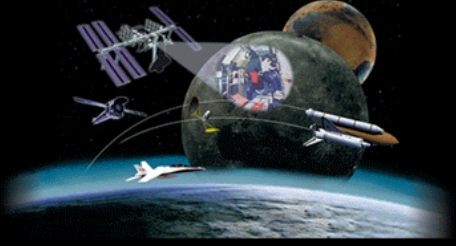


## **STANDARDS UPDATE NOTIFICATION SYSTEM (SUNS) “ALERT”**



**NASA Technical Standards Program**

- **Pilot Test – Solid Rocket Booster (TVC System)**
  - 14 TVS Requirements Documents Referenced 552 Standards
    - 124 Active Standards
    - 174 Cancelled or Inactive; Replacements Cited for 129
    - 244 Uncontrolled NASA Center Standards



# **LESSONS LEARNED/BEST PRACTICES/APPLICATION NOTES – STANDARDS INTEGRATION SYSTEM**



**NASA Technical Standards Program**

- **Standards are a Natural Focus for Lessons Learned**
  - Standards are Tools Used by Engineers
  - Integrating Lessons Learned With Standards Provides Basis for Interpretation/Use and Update of Standards
  - Aerospace Engineering Lessons Learned Data Sources Identified Which Link to Over 1,700 Lessons Learned Listings
- **Current Status**
  - 477 Lessons Learned Linked to 245 NASA Preferred and Non-Government Technical Standards
  - The Enhanced Search Results Page Permits Users to View Specific Lessons Learned by Technical Discipline Categories
  - “Application Notes” (AN) Clarify or Limit the Scope, Use, or Context of a Given Technical Standard; 168 AN’s Linked to NASA Preferred and Non-Government Technical Standards

## Document Summary Page

<b>MIL-STD-1686</b>	Revision: C	Status: Active	NASA Status: Preferred
<a href="#">DoDISS info</a>	No. of NASA Accesses since 06/2001: 118	SDO: MIL	Year Reaffirmed:
<b>TITLE: ELECTROSTATIC DISCHARGE CONTROL PROGRAM FOR PROTECTION OF ELECTRICAL AND ELECTRONIC PARTS, ASSEMBLIES AND EQUIPMENT (EXCLUDING ELECTRICALLY INITIATED EXPLOSIVE DEVICES) (SUPERSEDING <a href="#">MIL-STD-1686B</a>)</b>			<a href="#">Request Standard Update Notification</a>
Base	Date: 10/25/1995	19 pages	<a href="#">View Doc</a> <a href="#">View TOC</a>

## Document Scope

**[Base - 10/25/1995]**

The purpose of this standard is to establish comprehensive requirements for an ESD control program to minimize the effects of ESD on parts, assemblies, and equipment. An effective ESD control program will increase reliability and decrease both maintenance actions and lifetime costs. This standard shall be tailored for various types of acquisitions.

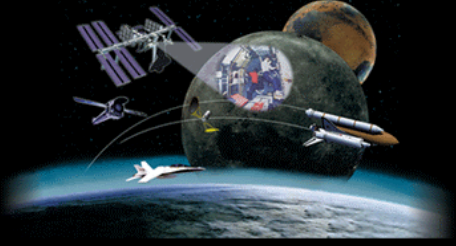
## Application Notes

[Submit Application Note](#)

Applicable Revision	Project ID	NASA Center	Creation Date	Note
All	-	JPL	4/26/2001	Requires that each facility have a document that describes how they implement ESD controls (for example, see MSFC-RQMT-2918).

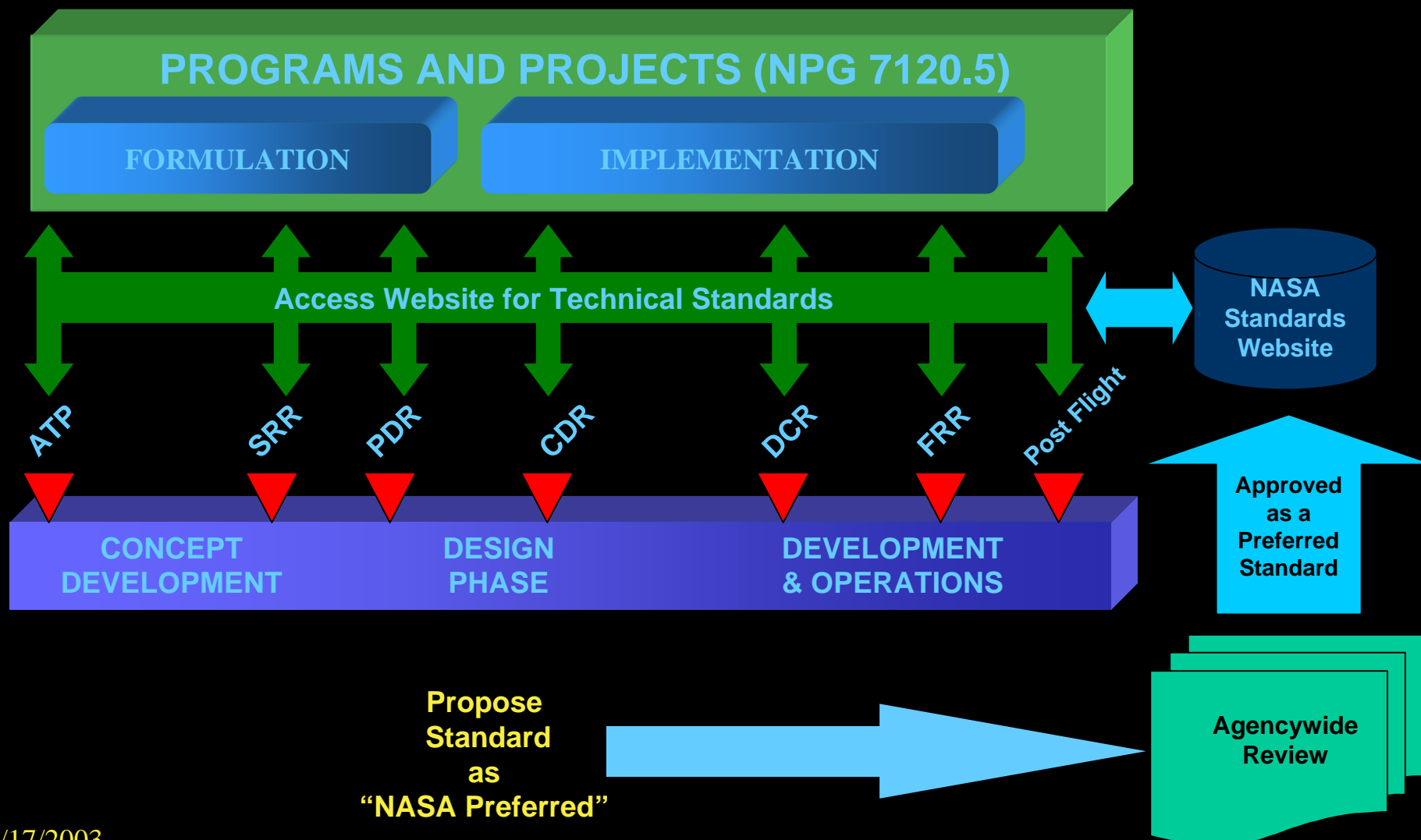
## Lessons-Learned and Best-Practices

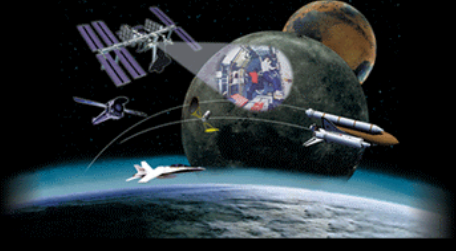
LL/BP No.	Title	Date	Relevance to the Standard
<a href="#">GSFC-0032</a>	Assessment and Control of Electrical Charges		This practice references the use of MIL-STD-1686 to establish comprehensive requirements for an ESD control program to minimize the effects of ESD on parts, assemblies, and equipment.
<a href="#">LLIS-0151</a>	Throat Plug and Purge Adapter Assembly Grounding	10/8/1992	This lesson addresses a scenario where improperly grounding the throat plug and adapter assembly or a lack of grounding may cause static electricity build-up and electrical sparks which could act as an ignition source for any flammable vapors present.
<a href="#">LLIS-0301</a>	Electrostatic Discharge (ESD) Wrist Strap Contamination of Magellan Flight Hardware	9/15/1993	Electrostatic Discharge (ESD) wrist straps can shed conductive METALLIC fibers into electronic hardware.
<a href="#">LLIS-0685</a>	Electrostatic Discharge (ESD) Control in GSE	2/1/1999	The Lesson provides technical recommendations for the control of ESD in aerospace equipment.
<a href="#">LLIS-0732</a>	Electrostatic Discharge (ESD) Control in Flight Hardware	2/1/1999	The Lesson addresses the generation of triboelectric and electrostatic charges as a common cause of damage and/or degradation to unprotected Electrostatic Discharge Sensitive



# ***FUTURE PLANS***

## ***NASA Technical Standards Program***





## **NASA Technical Standards Program**

**Michael Dell was asked in an interview what was the leading factor in his company's success.**

**Michael replied almost immediately—  
"Standardization" and added,**

***"The Success at Dell Has Been Built Upon  
the Innovation and Creativity That  
Standards Provide to Those Who Use Them  
Wisely."***